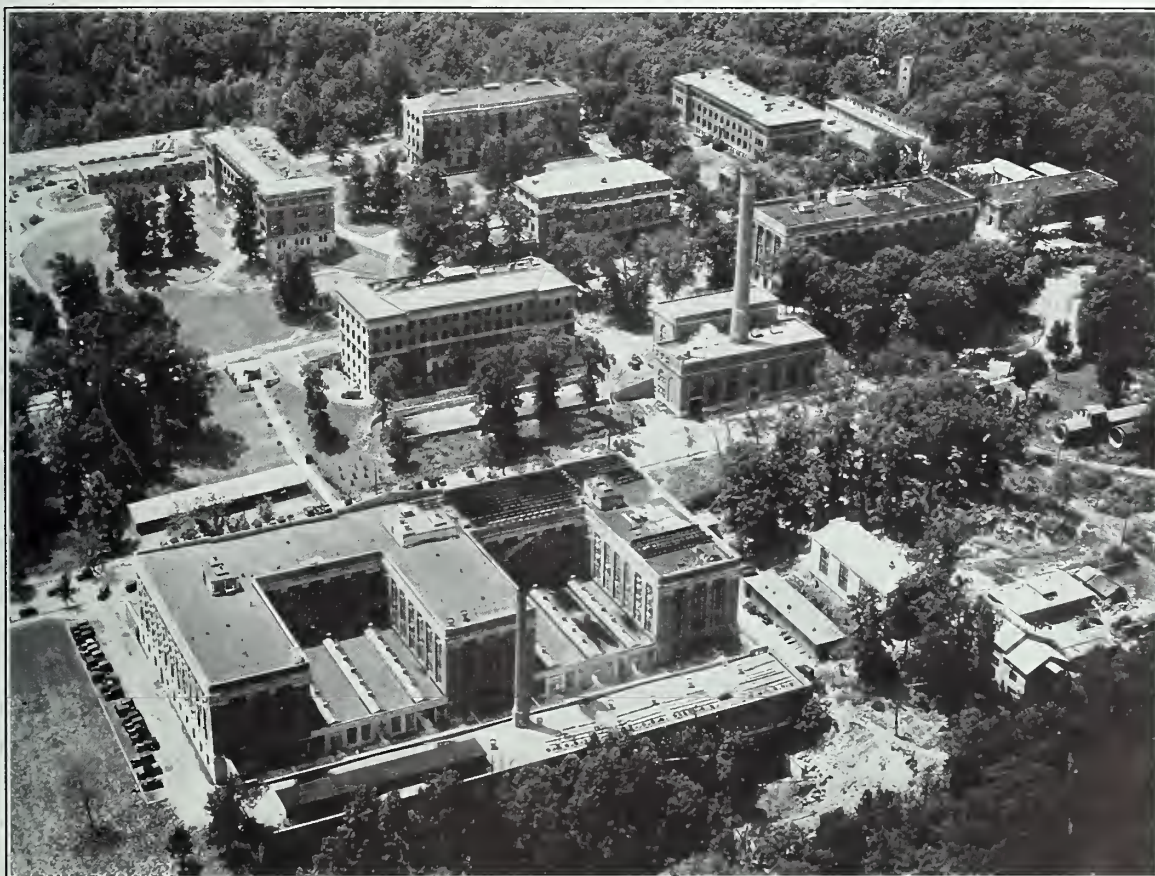


Bureau of Standards
SEP 21 1932

COMMERCIAL STANDARDS MONTHLY



*A Review of Progress in
Commercial Standardization and Simplification*



Photographed by Army Air Corps

AIRPLANE VIEW OF BUREAU OF STANDARDS (LOOKING SOUTH)

ISSUED BY THE BUREAU OF STANDARDS OF THE UNITED
STATES DEPARTMENT OF COMMERCE, WASHINGTON, D. C., U. S. A.

Vol. 9, No. 3



SEPTEMBER, 1932

For sale by the Superintendent of Documents, Washington, D. C.

The Commercial Standardization Group

A. S. McALLISTER, Assistant Director

DIVISION OF SIMPLIFIED PRACTICE

Edwin W. Ely

The division of simplified practice cooperates with industrial and commercial groups to reduce waste, usually through eliminating unnecessary variety of product, method, or practice. Its function is to bring together all parties interested in a project of this character, and to coordinate their work in developing a simplified practice recommendation. Such work includes surveys of current practice, formulation of a simplified practice program, and presentation of that program for action by a general conference representing all interests. The division then transmits to all concerned a full report of the general conference, with a request for written acceptance of the action taken. When the volume of acceptances is sufficient to indicate initial success, the Department of Commerce indorses the program and publishes the recommendation. The division thereafter cooperates with a standing committee appointed by the industry concerned, in conducting periodic surveys to determine the degree of adherence, to maintain and extend support of the recommendation, and to secure data for reaffirmation or revision. Simplified practice may be applied to any commodity or activity in which it will reduce waste. The division stands ready to render service in developing and making effective any application of simplified practice which will reduce waste, stabilize business, or extend commerce.

BUILDING AND HOUSING DIVISION

J. S. Taylor

The division of building and housing, formed in 1921, cooperates with business, technical, and professional groups in furthering construction activities. It works to modernize building codes and to encourage improved standards for the quality of building construction, and the practical application of the latest development in design and use of building materials.

It encourages home ownership through the development of an enlarged, steadier, more intelligent, and more discriminating demand for dwellings—the largest single class of buildings which the construction industries provide.

The division also cooperates with other governmental agencies and with many private business and professional groups in efforts to distribute building activity more evenly throughout the year and to secure less fluctuation from year to year.

The work on city planning and zoning has the broad objective of making buildings more useful through proper location with respect to other structures, stabilizing of land values and property uses, well coordinated thoroughfare systems, and well laid out public works.

DIVISION OF SPECIFICATIONS

A. S. McAllister

The duties of the division of specifications are to promote and facilitate the use and unification of specifications. In doing so it carries on activities involving cooperation with technical societies; trade associations; Federal, State, and municipal Government specifications making and using agencies; producers, distributors, and consumers; and testing and research laboratories. It ascertains the standardization and specifications promoting activities of the associations and societies, and brings to their attention the work being done by the commercial standardization group. It brings the Federal specifications and commercial standards to the attention of the maximum number of producers and users of commodities complying with these standards and specifications. It compiles and distributes lists of sources of supply of materials guaranteed to comply with the standards and specifications. It shows both buyers and sellers the benefits from handling nationally specified, certified, and labeled commodities. The division prepares directories of governmental and nongovernmental testing laboratories and the Directory of Specifications, and is working on an encyclopedia of specifications, the first two volumes of which have been issued, namely, "Standards and Specifications in the Wood-Using Industries" and "Standards and Specifications for Non-metallic Minerals and their Products." It also aids in preparing the Standards Yearbook.

STANDARDIZATION
..IS..
A CONTINUING PROCESS
~
ITS AIM IS NOT FIXITY
OR STAGNATION
..BUT..
TO ADD SERVICEABILITY
AS OFTEN AS THE
POTENTIAL GAIN
MAKES IT WORTH WHILE

DIVISION OF TRADE STANDARDS

I. J. Fairchild

The division of trade standards, on request, assists industrial and commercial groups in the voluntary establishment of standards covering grades, quality, dimensional interchangeability, or other acceptance criteria as a national basis for marketing manufactured commodities.

The detail criteria are selected or determined voluntarily by interested buyers or sellers, without any Government dictation or domination, and adjusted at a general conference of producers, distributors, and users so as to represent the composite views of all branches. The division functions chiefly as a neutral agency to see that all interested elements are given full opportunity to be heard and satisfied; to solicit and record acceptances; and to publish and promulgate the standard when a satisfactory majority of acceptances is obtained and provided there is no active opposition.

Industries are encouraged to apply self-certifying labels to products meeting the commercial standard requirements, as a means of protecting the consumer and the scrupulous seller from misrepresentation or unfair methods of marketing.

Provision is made for regular revision of the standard through the appointment of a standing committee to consider periodically any necessity for revision of the standard, in order that it may be kept constantly compatible with progress in the industry.

COMMERCIAL STANDARDS MONTHLY

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AN INVITATION TO VISIT THE BUREAU OF STANDARDS

A cordial invitation is extended to all interested in scientific progress to visit the laboratories of the Bureau of Standards when in Washington. A personally conducted trip is organized at 2.15 p. m. daily except on holidays. Special trips for groups may be arranged at other times by writing to the bureau in advance. The bureau's illustrated Visitor's Manual may be had for the asking. This lists the work in progress and gives an airplane view of the ensemble and a brief statement of typical discoveries and inventions which have been notable, basic contributions to radio, aviation, and other modern arts and industries.

COAL STANDARDS

FIELD SURVEY AND CLASSIFICATION STUDIES

By MARIUS R. CAMPBELL

Geological Survey, United States Department of the Interior



IN ORDER to determine the extent and value of the coal fields, field parties organized by the Geological Survey, of the Department of the Interior, have examined and mapped practically every coal field of the West. The geologic mapping of the western coal fields is still in progress, though many of the most valuable areas have been examined, and the thickness, extent, and quality of the coal beds have been determined. Some of the more important results of this work are: (1) The publication of many reports describing individual coal fields, indicating the outcrop of each bed, and giving careful estimates of the tonnage present; (2) the publication in 1908 of the first fairly complete, though small, map of the coal fields of the United States; (3) the presentation at the Twelfth International Geological Congress, in 1913, at Ottawa, Canada, of the first reasonably complete statement of the coal resources of the United States; and (4) the publication by the Geological Survey in 1917 of a large wall map of the United States showing all the coal fields and, by the use of different colors, the distribution of the various kinds of coal that are generally recognized. These are anthracite, semibituminous, high-grade bituminous, low-grade bituminous, sub-bituminous, and lignite.

It is interesting to note that when the World War threatened to involve the United States, the previous work of the Geological Survey in mapping and studying the coal fields of the country made it unnecessary to question the amount, location, and accessibility of coal that was available.

The latest work of general interest in the study of coal is the attempt of various organizations to agree upon a standard classification, so that anyone ordering coal may specify the kind he desires and be sure that the dealer will understand what he means. If such a standard is adopted, it will mean a universal language, so far as coal is concerned, which may be used and understood not only by the scientist, but by the dealer, the railroad man, the attorney, and the Representative in Congress, and which, it is hoped, will bring order and understanding where now there is only confusion.

The work is being carried on by several committees working under the rules of the American Standards Association. On these committees are representatives of the Geological Survey and the Bureau of Mines, and the results so far achieved are due largely to the field work of the former and the excellent laboratory work of the latter. This combination of activities has produced results which may enable these committees to solve the troublesome questions that constantly arise regarding the number of classes to be recognized and the criteria for their differentiation.

INTERIOR ILLUMINATION

Proper Illumination Results in Economies, but Depends on Adequacy in Interior Wiring

By G. H. STICKNEY and WALTER STURROCK¹

Progress in securing good illumination in building has, within a few years, been seriously impeded by lack of sufficient wiring capacity, much to the disadvantage of owners and managements. For the rank and file of ordinary lighting installations, such as small stores, workshops, and offices, rather definite rules have been evolved. In fact, these rules have become sufficiently definite as to constitute practices from which the requirements which lighting imposes upon the wiring may be predicted within reasonable limits.

The lighting practices, referred to, have been expressed in papers and reports before various associations. Notable among these are the lighting codes of the Illuminating Engineering Society, the American Standards Association, and the International Commission on Illumination. The accepted illumination levels for the most common conditions of building lighting have been compiled in tabular form by leading illuminating engineers. Among other places these tables have been published in the Franklin Red Seal Specification of the Society for Electrical Development, which also prescribes approximate rules for the lighting design of the simpler and more common classes of building interiors.

While, as has been pointed out, electric lighting practice in the more common applications is comparatively definite, it is not static. Illumination levels—that is to say the quantitative elements—have been rising steadily for many years and except for the retardation during periods of business depression, there is no indication that most fields have approached saturation. Moreover, there is an increasing demand for diffusion and reduction of glare, which is generally secured at a sacrifice of light, and therefore puts an additional requirement on the amount of electricity to be supplied. While qualitatively these advances are generally recognized, it is exceedingly difficult to secure any quantitative measure for them. Since the advances are the resultants of various forces, some peculiar to the application, the locality, the time, etc., it follows that they are variable and can not be simply expressed. Probably the best authoritative examples are illustrated by the illumination values for the industrial lighting field as published in the 1921 and 1930 issues of the American Standard Code of Lighting for Factories, Mills, and Other Work Places.

There is hardly an aspect of present-day industrial problems that does not involve, directly or indirectly, the problem of lighting. Safety, workman's compensation and insurance premiums, output, labor turnover, spoilage, quality, unit cost, fixed charges, and maintenance—every one and all of these are affected favorably or unfavorably by the illumination.

To-day industry is thinking of illumination in terms of fewer accidents and lower insurance premiums, less labor turnover, reduced spoilage, and greater output of higher average quality. Adequacy of wiring is of major importance as explained in this article.

For a number of years illuminating engineers have been encountering installations in which suitable lighting could not be provided because of a lack of capacity in the wiring. This was first evidenced by the blowing of fuses when new lighting equipment was put in operation. It became, therefore, necessary to check up on capacity before placing larger lamps in old installations or recommending suitable lighting even in some new installations. While the advance discovery of the limit saved some embarrassment, it did not produce a happy situation to be unable to provide the illumination needed and desired by the building's occupants. Even where the safe carrying capacity of the wiring was not exceeded, excessive losses of electrical pressure in the wiring were frequently encountered so that the voltage delivered to lamps was considerably less than it should have been. Such losses were greatest at times when the demand was greatest, and resulted in serious reduction in light output and lamp efficiency. To the user it showed itself in inadequate illumination, a yellowing of the light, and when other loads were switched on and

off, a flickering of the lighting.

A review of the papers and reports presented before the American Institute of Electrical Engineers and other engineering association, shows careful treatment of practically every other phase of electrical engineering. Building wiring alone seems to have been neglected, perhaps because it has been considered as an economic problem rather than an engineering problem. Inasmuch as the engineering result of the entire system is in so large a measure vitiated by wiring inadequacy, it seems important that more attention be given to this subject. Moreover, it is not sufficient to provide merely for initial requirements. The wiring should be planned with reference to the expected life of the building, anticipating future needs as far as possible. Hence it is also important to consider the trends of lighting practice.

Interior wiring has received a great deal of attention on the part of code writers, and has been the subject of numerous rules. By many in the electrical industry the National Electric Code has been taken as a standard of good engineering, overlooking the fact that the purpose of this code is fire prevention and other safety features. Being mandatory in character, the code can not prescribe wiring on the basis of best economic engineering. Because of the common failure of those responsible for such wiring to provide for later additions to the load on a wiring installation

¹ Incandescent lamp department, General Electric Co., Nela Park, Cleveland, Ohio; an abstract of paper recently delivered at a meeting of the A. I. E. E.

it has been necessary for the code to anticipate these additions, but still on the basis of safety only. The code has been the subject of considerable controversy among the various interests involved. Since good engineering would incorporate the requirements both for safety and for economic operations, there is good reason to believe that these misunderstandings would disappear and the code assume its rightful position if good engineering were to prevail in this field.

In the interest of good economic engineering there is needed a reasonable standard, based upon good lighting practice, with an allowance for advances in the art and probably changes in the use of buildings. Such a standard would do much to overcome the conditions which have been responsible for the present unsatisfactory condition. A few illuminating officers, with country-wide contacts, became conscious of building wiring as a limitation of good lighting about 1924. After several years of study, investigation and consultation with an ever enlarging circle of engineers, a plan was formed, and in the summer of 1928 the National Electric Light Association was asked to promote a movement for better wiring practice.

Preliminary specification paragraphs were agreed upon in the spring of 1929. Immediately some of the illuminating engineers, especially those associated with electric utility companies began an informal application of the standards so embodied. The results were very gratifying. After a year's experience an extension of these paragraphs for commercial buildings was published by the National Elec-

tric Light Association. In the summer of 1931 a corresponding specification for industrial buildings was issued under the same auspices. Several interested groups and individuals undertook the preparation of corresponding specifications for residence wiring. In the fall of 1931 an industry committee was organized to coordinate the several undertakings into a single standard specification. This work is not yet completed, although the reports indicate that the end is in sight. The specifications for commercial and industrial structures are undoubtedly the best available expression of the needs felt by illuminating engineers for building wiring. While especially intended for the smaller installations, the quantities and principles are applicable to larger buildings. They have been used as a guide in hundreds and probably thousands of installations and all reports seem to indicate that they represent reasonable and proper standards.

It is to be hoped that consulting engineers will familiarize themselves with these specifications, and subject them to criticism, and that out of this there may come generally accepted standards of wiring practice. This would strengthen the weak link in the system of electric lighting, and encourage a normal development along the lines of good economic engineering. The public could then look with confidence to its advisors in the field of electric lighting, and be assured that good illumination, according to its needs can be had in any building constructed under responsible auspices.

PACKAGING OF RAILWAY EQUIPMENT

General Conference Approves Simplifications for Packaging of Electric Railway Motors and Controller Parts and Packaging of Electric Railway Bonds and Bond Terminals

On August 18, 1932, a general conference on the packaging of electric railway motor and controller parts was held at the Bureau of Standards. This meeting was attended by representatives of the electric railway industry, as well as manufacturers of motors and controllers and other interested parties.

The conference was called at the request of committee No. 2, standard packages, of the American Electric Railway Association. This committee had developed a simplified-practice recommendation based on the practice of the consumers as represented by electric railway operating companies and desired to submit it to such a meeting for approval. The recommendations as proposed were approved with minor modifications. These modifications were made in the interest of greater clarification and did not affect the important details of the recommendation.

The program will become effective January 1, 1933. A standing committee was appointed, made up of four manufacturers and four users. The function of this standing committee will be to keep the recommendation abreast of the development of the industry and make such revisions as appear necessary from time to time.

A simplified-practice recommendation on the packaging of electric railway bonds and bond terminals was also considered and was approved subject to such changes as might be deemed necessary by the manufacturers to make the recommendation more effective.

FEDERAL SPECIFICATIONS

Twenty-four specifications were acted on by the Federal Specifications Board during the month of August. Of this number two proposed specifications, and 22 revisions were received and sent out for official comment and criticism. Copies of these specifications (in mimeographed form) and further information can be obtained from the Federal Specifications Board, Bureau of Standards, Washington, D. C.

Specifications proposed:
Sets, nail.
Tags, shipping and stock.

New designation	Specifications to be revised	Old F. S. B. No.
C-M-381a	Milk, fresh	
H-B-51	Brooms, corn	333a
H-B-71	Brooms, rattan, push	204
H-B-75	Brooms, rattan, upright	205
H-B-91	Brooms, scrubbing	206
H-B-101	Brooms, whisk	332
H-B-111	Brooms, push, wire	207
H-B-131	Brushes, hatching and dauber	191
H-B-201	Brushes, dust, counter	208a
H-B-221	Brushes, dust, radiator	199
H-B-271	Brushes, garage, fiber	398
H-B-321	Brushes, hair, military	198
H-B-471	Brushes, roof, knotted style, 3 knots	518a
H-B-551	Brushes, scrubbing, hand, white Tampico	407
H-B-571	Brushes, shaving	200
H-B-591	Brushes, sidewalk	201
H-B-671	Brushes, tooth	202
H-B-751	Brushes, window	203
O-E-571	Eosin Y, color index No. 768	318
KK-L-181	Leather, hydraulic packing (vegetable tanned)	496
WW-T-721	Tubes, hoiler, iron, lap-welded, charcoal	349
WW-T-731	Tubes, boiler, steel, lap-welded and seamless	347

AMERICAN SOCIETY FOR TESTING MATERIALS

Society Tenders Report on New Projects in Progress or Contemplated

There is given below a summary of new projects in progress or contemplated by several of the committees of the American Society for Testing Materials. This is some indication of the extensiveness of standardization activities planned by the society for the next year.

Steel.—Committee A-1 on steel has under consideration specifications for seamless alloy-steel still tubes and seamless carbon-steel tubes and pipe for gasoline cracking plants.

Wrought iron.—A few of the important items before the committee on wrought iron include the preparation of specifications for wrought-iron rivets and for sheets and shapes of wrought iron, and a revision of the plate specifications. The committee is collecting data on what constitutes quality in wrought iron, and has under consideration an investigation on effect of elevated temperatures on wrought iron to be confined at first to wrought-iron pipe.

Cast iron.—For the past two years, the committee on cast iron has been engaged in an investigation of impact testing of cast iron. The work has been substantially completed and it is expected that a report will be presented to the society next spring. The subcommittee on pig iron has been enlarged and the first work of the subcommittee will be to review the present specifications and to determine whether or not these are satisfactory. Consideration is also being given to the heat treatment of gray cast iron, a subject which is developing rapidly.

Malleable-iron castings.—Committee A-7 on malleable-iron castings is engaged in the study of the cause of galvanizing embrittlement of malleable-iron castings. This study is being conducted without any particular thought in mind of developing a specification covering this particular feature at this time, although there may be a demand for such a specification when a better understanding of the subject is available. A specification for malleable-iron castings suitable for pipe fittings, valves, and valve parts is being developed, and considerable progress is reported by the subcommittee in charge. The corrosion-resisting properties of malleable iron as they pertain more in particular to castings for overhead trolley construction are being investigated.

Magnetic analysis.—Committee A-8 on magnetic analysis is proceeding with a survey of the magnetic properties of commercially important steels. It is proposed to collect a representative series of samples and determine their magnetic properties after certain specified heat treatments which will correspond as nearly as possible to the treatment given to individual steels in practice.

Light metals and alloys.—Committee B-7 on light metals and alloys, cast and wrought, is continuing the preparation of specifications for the wrought alloys of aluminum and magnesium as rapidly as the demand for the products is called to its attention. During the present year the committee is anticipating the issuing of specifications for aluminum-alloy tubing and aluminum-alloy forgings. The committee has also undertaken the preparation of comprehensive data

covering the various alloys of aluminum and magnesium. These data will include a survey of the industrial applications of these materials and a compendium of the chemical analyses, physical properties and fabricating qualities of several commercial alloys; they will be prepared primarily for the engineer and fabricator interested in the designing and construction of metal structures and apparatus. The data will also include a comprehensive article on the corrodability of the alloys in various media and practical methods for preventing deterioration due to corrosion.

Fire tests of materials and construction.—In the committee on fire tests of materials and construction, new subcommittees on fire tests of acoustical and similar finishes, and one fire tests of scaffolding are in process of organization. The committee contemplates certain refinements in the Dunlap fire-tube test and the preparation of standard methods of the crib and timber tests which have been in use for some years in New York, N. Y.

Refractories.—The committee on refractories will undertake during the coming year a wider distribution of information regarding standards among both producers and users of refractories. It is planned to get the standards and specifications booklet, which will include all A. S. T. M. standards on refractories and the manual of interpretation of refractory test data, into the hands of those primarily interested in the use of refractories.

The subcommittee on spalling is following and encouraging the work at Mellon Institute, where wall sections are being air-spalled and water-spalled before and after slagging. The committee feels that a test which more nearly simulates service than has been suggested in the past will be the only satisfactory answer to the question of whether a given brick sample will stand a given service. The only field in which any of the proposed standards for spalling can be recommended is that of comparison of the uniformity from shipment to shipment in the case of one brand. There is no method that can be used for the comparison of brands.

The subcommittee on temperature measurement has been doing some excellent work in the comparison of temperature measurements especially in various P. C. E. (pyrometric cone equipment) furnaces and using various fuels. During the coming year this committee will make a survey of temperature measurements and atmospheric conditions in load-test furnaces of various types.

Committee C-8 is making progress in the preparation of specifications for refractory insulation. This work is an amplification of the committee's original program for determining methods and standards for thermal conductivity. The work is of particular interest, since at least two new high-temperature insulating materials have come on the market during the past year and indications appear to be that in the very near future there will be several materials for furnace linings which will be not only good insulators but primarily refractories.

Concrete and reinforced concrete.—Committee C-9 on concrete and reinforced concrete has, as usual, a very full program under way. The subcommittee on strength tests has studies in progress on methods of capping, on loading beams, and a method of measuring cores drilled from a concrete structure. A suggested standard test method for permeability and the standardization of test methods for absorption are active projects of the subcommittee on permeability. The subgroup on aggregates has more than 20 items listed, including studies of soundness, abrasion, lightweight types, etc. Standardization work involves tests to ascertain the amount of soft and rotten particles, specific gravity, alternate mortar test for sand, etc. The subcommittee on extraneous substances in concrete is working on the effect of mica in sands, effect of organic matter and oil-bearing aggregates, and a standard color solution.

Several other subgroups of this committee have important problems before them. The subcommittee on admixtures is developing a method of measuring unit weight and the normal consistency of these materials. A standard method of test for determining volume changes in concrete is being worked up by the group covering elasticity and volume changes. The subcommittee on durability has several items to forward, including the development of test methods for measuring durability and the method of making freezing and thawing tests. A proposed method for this latter project was appended to the annual report of the committee, which was presented at the recent A. S. T. M. annual meeting. Consideration is being given by a subgroup to proposed tentative specifications for ready mixed concrete.

Hollow masonry building units.—Committee C-10 on hollow masonry building units has in preparation definitions of terms relating to concrete masonry units, and it also expects to propose revisions of the definitions relating to structural clay tile. Its program includes a study of the specifications relating to structural clay tile with particular reference to the tables of dimensions and weights.

Petroleum products and lubricants.—The working groups in committee D-2 on petroleum products and lubricants are subcommittees and technical commit-

tees, the former concerned with the development of methods of test and the latter with the relation between test data and service performance of materials and with the preparation of material specifications. The outstanding features of the subcommittee program are as follows:

Subcommittee 4 on grease is giving further study to the penetration method D217-27T, particularly with respect to its use on hard greases; subcommittee 5 on viscosity is cooperating with representatives of committee D-9 on electrical insulating materials on the determination of the viscosity of electrical insulating oils at temperatures around 0° C.; subcommittee 8 on distillation is developing a method for distillation of petroleum oils under vacuum; subcommittee 10 on Sligh oxidation test is a new subcommittee organized to perfect the Sligh oxidation tests so that reproducible results may be obtained; subcommittee 12 on flash point is studying the determination of the flash point of cut-back asphalts and similar materials; subcommittee 21 on crude petroleum is developing a method for evaluating crude petroleum; subcommittee 27 on classification of transmission lubricants and automotive greases has been requested to prepare a classification of automotive greases based upon consistency and the viscosity of the mineral oil content.

Technical committee A on gasoline is investigating the relation between the gum content of gasoline by various methods and the behavior of the gasoline in service, also the gum stability of gasoline. An attempt is being made to correlate vapor pressure data by tentative method of test for vapor pressure of natural gasoline (Reid method) with vapor-locking characteristics of motor fuels. It is hoped that it will soon be possible to agree upon a tentative standard method for determining the antiknock rating of gasoline based upon the investigations of the cooperative fuel research committee; technical committee B on motor fuels is sponsoring a symposium on motor lubricants for the regional meeting of the society to be held in New York in March, 1933; technical committee C on fuel oils (including Diesel fuels) is cooperating with the technical committee on lubricants and liquid fuels of the Federal Specifications Board on a revision of the Federal specifications for fuel oils.

STANDARDS FOR BUYING AND SELLING

Unnecessary sales-and-purchasing expenses is an economic waste—a tax on industry—states the introduction to the Standards for Buying and Selling as promulgated by the National Association of Purchasing Agents for the guidance of its members in the conduct of their daily work. The introduction further states that its elimination will assure satisfactory profits to the producer, economy to the consumer, and greater efficiency in commercial relations.

The principles of these standards stipulate that purchasing agents will buy and sell on the basis of value, recognizing that value represents that combination of quality, service, and price which assures greatest ultimate economy to the user, and to strive for simplification and standardization within the bounds of utility and industrial economy, and to further the development of products and methods which will improve industrial efficiency.

COMMERCIAL STANDARD APPROVED FOR FIBER INSULATING BOARD

General approval of the commercial standard for fiber insulating board has been indicated by the acceptance of this standard by practically all of the larger manufacturers of this type of insulation, together with the indorsement of many retail lumber groups, architects, and other interests. Announcement to this effect was made in a circular letter from the division of trade standards under date of August 15.

The commercial standard is a minimum specification that will aid the architect, builder, and prospective home owner in procuring insulating boards of satisfactory thermal conductivity as well as those possessing the necessary strength and other characteristics, including water absorption and plaster bond.

Minneographed copies of this specification are obtainable gratis from the division of trade standards, Bureau of Standards, Washington, D. C.

PRECISION MEASUREMENTS IN FIREARM IDENTIFICATION

Problems Encountered in the Art of Identifying Firearms

By WILMER SOUDER, *Bureau of Standards*

Opinions on the science of firearm identification fall into two general groups. The first group would be represented by those who have no faith in the work and who condemn experts as absolutely unreliable and a menace to the State. The second group would be represented by those willing to grant that there are valuable results coming from such work when properly handled. It is to this second class of individuals that this paper is particularly directed. However, the first group should not be ignored. Perhaps they have more reasons for their skepticism than many of us have heretofore been willing to admit.

Obviously when prosecution and defense each introduce expert testimony and this testimony is divergent and contradictory the accuracy for the total expert testimony can not be 100 per cent. Furthermore, many people claim that if the prosecution expert and the defense expert are fully qualified as honest experts there will be no difference in opinions. Facing this condition the public often concludes that one or both experts have not made perfect nor complete preparation for expert testimony.

We should not forget that even the decisions of our courts are not always unanimous, although each member of the court has studied the same evidence. The duties of an expert is to display and interpret the facts to the best of his ability, in accordance with the obligations of his oath he can do no more and he must do no less.

Lack of agreement need not be used as an argument to disqualify all experts. To reject all testimony because of disagreement would, if applied to all activities, create difficulties and complications beyond measure, especially in social, political, and religious relations. The existence of so much conflict among so-called experts permitted to testify to-day does, however, constitute a most serious handicap to the effectiveness of truly expert testimony. A hint as to how this condition might be minimized in the field of ballistics will be given later.

To the second group, holding favorable opinions of the value and acceptability of this type of evidence, it is a pleasure to give some of the fundamentals of the methods used. There need be no argument raised about the possibility of identifying all bullets from all guns. We must admit that through vicious treatment of bullet or gun, ignorance or neglect in caring for the gun or bullet and many other conditions beyond control of the expert, it is often impossible to say whether or not a certain bullet passed through a certain gun. Similar uncertainties exist in legal procedure regarding the physical or mental condition of a person at some previous date, regarding the accuracy of records, and many other items on which positive proof is not available.

Where sufficient original markings on bullets or shells are not available for definite conclusions, it is the duty of the expert to admit his inability to solve the problem. There are now sufficient data to prove

that, with the limitations as listed above, the work in firearm identification ranks high as a safe and efficient tool for use by all officials of the law.

This brings us at once to the center of strife, namely, "What constitutes sufficient markings?" The only satisfactory answer possible at this time comes through experience in varied types of tests. The individual must decide for himself that he is sure of the identification when certain conditions exist. This certainty of ability must be established by the correct solution of secretly prepared tests using more and more difficult combinations, locating the causes and amounts of individual variations of bullets from the same gun, and from different guns of the same make. The expert should work conscientiously in the field until he recognizes what can be done and what can not be done. He should never hesitate to withhold weak or improperly supported opinions on the marginal or border line cases.

Until satisfactory proof of expertness is required by the court the untrained and the biased experts will be able to continue in "business" and will continue to cloud rather than clarify cases. Before 12 jurors they must be only 81/3 per cent efficient in clouding the case to secure a hung jury, and this is usually a 100 per cent victory for their plan.

We have need for an examining and licensing board to pass upon the abilities and conduct of those who wish to advise or testify as experts. An organization of approved experts could advise intelligently the bench and bar upon the value and limitations of expert testimony and the general method of collecting and presenting evidence. Courts now accept various statements as supporting claims for expert qualifications and admit much evidence which can not be supported. The fact that one holds a medal for marksmanship or has had Army or police service is often accepted as proof of ability in identification. This popular qualification is enhanced, in the minds of the jury, if the witness has written articles or has lectured on some phase of ballistics or if his picture has appeared in the local papers. Experience in selling or using sporting goods is not overlooked as a quality which might suggest expert abilities. The public knows so little about this science of identification that it fails to realize that experience in one or all of the above fields does not guarantee ability of any value whatever in this work.

Such persons wishing to be accepted as experts without having actually to qualify are usually very anxious for publicity in the press and are quite free in their interviews. Fortunately for such the public does not always recognize the art of this scheme and misconstrues this shrewdness in advertising and selling service for ability in the field of identification. Firearm identification can not be permitted to depreciate to a point where shrewd advertising is necessary for success before a court. Firearm identification and advertising are two different arts. Favorable attributes which contribute to expert ability are:

1. Experience in metrology either in a school or laboratory shop, where accurate measurements of small dimensions are made by the use of micrometer microscope and photographic camera. It is indeed painful to see the awkward, crude, and often impossible attempts made before juries by some unskilled "expert" attempting to justify measurements or values which can not possibly be made with the accuracy or method shown. Exposure of the charlatan-ism of such before a jury is seldom worth the effort as, to be effective, the exposure must be 100 per cent perfect. The lack of training and familiarity with precision measurements by one or more members of the jury makes 100 per cent exposure practically impossible.

2. Familiarity with the details of manufacture of arms and ammunition, the defects in new arms and the defects which develop with use. These are absolutely necessary.

3. Demonstrated ability to identify exhibits, bearing secret identifying marks, approximating, in difficulty, those on which he is testifying. These tests if not previously taken might well be arranged before the expert takes the stand, but never after. The preparation of such tests to be effective must not be delegated to amateurs. Unfortunately courts will not permit the introduction of such proof of ability unless all parties conducting the test are present in person to testify.

4. Ability to prepare evidence in photographic form so that permanent records may be available for use in appeal cases and for study by those wishing to verify the "expertness of the expert."

The positiveness of the identification of the bullet, shell, and gun depend upon the agreement of peculiarities or individualistic markings appearing on the two articles compared, one from the body, say, and one from a known weapon. The first objection to this type of identification usually comes from the ignorant or unscrupulous individual, who through incomplete information, insists that all bullets or shells from a certain type of arm are marked alike. To this we must agree if we are considering only gross markings; just as we must agree that all graduates of a certain military academy look alike, especially if we view them a mile away. Many so-called experts seldom get closer than "a mile" to the real evidence of arm identification. College professors, medical examiners, and portrait photographers soon find means for detecting differences in college students. By approaching closer than a mile and giving close attention to the individual characteristics these students are soon rated so that no mistake need be made in identifying any one of the group. The disguise which any student might receive through accidental injury, sickness, or fatigue need not prevent his identification at the hospital. The physician or police officer in making the identification disregards all marks and conditions produced by known extraneous combinations.

A very similar condition exists in examining bullets. By reason of their passing through hard substances, such as bones, certain parts of clothing, etc., they acquire accidental or superfluous markings which must be ignored. Further superfluous markings, which must not be expected on test bullets, result from loose particles left in the barrel, such as slivers of metal cut from previously fired bullets, chunks of

rust in uncleaned barrels, and similar defects which develop between the firing of the two bullets under study. These must be ignored without argument or prejudice to the identification.

When we are confronted with the accumulated evidence of an unusual number of fine line structure agreements on the two bullets and find no inexplicable discrepancies, there is only one report possible and that is identity of source of bullets. The individual land markings on bullets when magnified, say twenty-five times the natural dimension, often reveal as many as 10 or more agreements in a single land and in a very complicated pattern. These land patterns are usually different in arrangement, depth, and breadth for each land as we go around the individual bullet; but show agreement if we compare corresponding land patterns of the two bullets. The agreement of these individual patterns at one and only one of the many possible position combinations, the consecutive order of the individual agreements and the continued agreement on additional test bullets give us evidence which, measured by mathematical analysis, assures us of a certainty "beyond any reasonable doubt." But few types of evidence approach this work for accuracy. The testimony of eye witnesses, for example, often admits of criticism for reasons which we are, unfortunately, not always able to explain. We do not bar such testimony despite its many known weaknesses. We prefer to use it for what it may be worth. The same criterion for ballistic identification is all any expert asks; but he asks that its worth be not injured by false claims or misrepresentations, and that those who comment thereon do so in definite terms and only after they have demonstrated positively their ability as experts.

So long as the public remains uninformed of the details of this work we shall have severe criticism of the results. These criticisms need not disturb officers collecting evidence and preparing cases. When the markings on evidence bullet and test bullet agree to a sufficient degree to show identity of source, the officers may build with safety on this fact. This will usually enable them to concentrate on a single suspect and thus save the expenses of the broad or unrestricted investigations which are so frequently conducted until definite data are produced.

If ballistic tests enable them to discover sufficient additional evidence to make the case (in practically all cases it will do this) there need be no serious thought taken at that moment of the ignorant public's opinion of arms identification. If sufficient additional evidence to make the case is not discovered, then it would appear better to wait, so far as ballistic work is concerned, as ballistic evidence does not always satisfy the second requirement of all properly prepared cases, namely, "placing the person at the scene." Otherwise excellent cases have been lost by overlooking this requirement. A verdict of acquittal is final and closes the case forever regardless of what evidence may develop next day or next year. Therefore, until the case is completed (disregarding ballistic evidence) it seems very unwise to go to trial. Any prosecutor who does so should realize that the responsibility for his actions rests upon his own shoulders.

With such rigid and definite methods, tools, and information available, we have one of the most powerful means for investigating available evidence in this field. The findings are safe; they are available to

any one interested; they consistently give the same testimony and by virtue of these facts, the expert has a most remarkable array of permanent records showing the reasons for his opinion.

Firearm identification will undoubtedly be retarded in its service to the administration of justice so long as so-called experts, inadequately trained to collect and to interpret physical data correctly and in harmony with the refinements peculiar to this science, are permitted to testify. Courts should be more correctly advised regarding the training and equipment necessary for such work, regarding the type of testimony and permanent records which should be required, and finally regarding limitations which must be observed in this as in all other sciences. There should be adopted:

1. Minimum standards of equipment to be used.

A NEW INDUSTRY ESTABLISHED

Manufacture of Sound-Absorbing Materials Has Materially Developed Within the Past Three Years

In the files of the Bureau of Standards is to be found the story of the development of a new industry. This of itself is noteworthy, but additional interest attaches to this case from the fact that fully three-quarters of this development has occurred during the business depression of the last three years. Reference is made to the manufacture of sound-absorbing materials for use in correcting the acoustic quality of auditoriums.

Though the underlying principles of architectural acoustics have been known for nearly 40 years, the subject attracted but little attention from those who should have been interested until the introduction of talking pictures. It was then found that many theaters which had been built for silent pictures were acoustically almost useless. This discovery stimulated the study of means for correcting the difficulty and directed attention to such sound-absorbing materials as were then available. These materials were limited in number, and some of them were serious fire risks. Development of new materials to meet the demand brought requests for service of the Bureau of Standards in the measurement of their sound absorption.

In 1928 the facilities for this work were limited to two laboratories, both in the State of Illinois. In the fall of 1928 the Bureau of Standards completed a reverberation room for making such tests and placed it in service. During the remainder of that year its facilities were used by two manufacturers. In 1929 seven different firms sent material for measurement, and this number was increased to 18 in 1930 and 23 in 1931, in which year the total number of samples measured was 97. For the first half of 1932 the demand for service of this character has been considerably in excess of the 1931 rate.

Another measure of the extent to which the bureau has been connected with this new manufacturing development is found in the increasing correspondence on the subject. So frequent became letters of inquiry regarding different acoustic materials that early in 1930 it became necessary to issue a letter circular on

2. Standards for records of evidence to accompany and substantiate the expert's opinion; there to include photographs, metrological data, and interpretations in permanent form.

3. Standards for qualification of experts which will include actual tests made against secretly designated materials and reported in compliance with item 2.

4. Methods for constant following up of experts testifying in court to guarantee the highest efficiency.

The compliance with such standards should be a guarantee of ability which could not be ignored by any court or jury. Conversely, those unwilling to comply with such regulations should be permitted to explain why they are unwilling to do so. It is felt, however, that any one who has given the time and effort to properly qualify in this field will welcome an opportunity to cooperate in a plan such as has been outlined.

the subject. The first edition of this circular in March, 1930, listed 11 materials which the bureau had measured up to that time. Seven editions of this letter circular have been called for, each edition listing an increasing number of materials. The latest edition, of April, 1932, lists 37 different materials, with several varieties of each, totaling 87.

In addition to furnishing this service, the Bureau of Standards has been called upon by architects for advice regarding the preliminary calculation of the acoustic quality of a proposed auditorium. It has become an established rule of the Government architects to submit to the bureau all plans for new Federal court rooms throughout the country for suggestion and criticism in this respect.

The bureau has also contributed to the development of improved methods and instruments for making sound-absorption measurements. The following publications, obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the prices named, give a description of the bureau's work along these lines.

Architectural Acoustics, by Paul R. Heyl, B. S. Circular No. 396, 1931 (C396), 5 cents.

Transmission and Absorption of Sound by Some Building Materials, by E. A. Eckhardt and V. L. Chrisler, B. S. Sci. Papers, vol. 21, 1926-27 (S526), 15 cents.

The Absorption of Sound at Oblique Angles of Incidence, by Paul R. Heyl, V. L. Chrisler, and W. F. Snyder, B. S. Jour. Research, vol. 4, 1930 (RPI49), 5 cents.

The Measurement of Sound Absorption, by V. L. Chrisler and W. F. Snyder, B. S. Jour. Research, vol. 5, 1930 (RP242), 10 cents.

FORGED-TOOLS SCHEDULE REAFFIRMED

Simplified-practice recommendation No. R17-31, on forged tools has been reaffirmed, without change, by the standing committee of the industry.

This recommendation, which was proposed and developed by the industry, has been instrumental in reducing the number of forged tools from 665 to 431, or 35 per cent, and their eye sizes from 120 to 10, or 91.6 per cent.

STANDARDIZATION IN CONNECTION WITH HOME MAKING

By V. B. PHELAN, *Bureau of Standards*

The desirability of having closer cooperation and increased standardization in connection with the design, construction, and equipping of homes in order to assure greater efficiency and to minimize fatigue in connection with the daily routine of household duties is clearly emphasized throughout Volume IX of the final reports of the President's Conference on Home Building and Home Ownership, entitled "Household Management and Kitchens."

The determination of real values in home making, the Committee on Household Management points out, involves setting up of standards based upon family well-being rather than upon tradition and convention. Even the extent to which a certain class of work in the home shall be done, it is said, can be determined only in terms of its contribution to the standard agreed upon.

In the establishing of standards for home making it is probable that they must be based principally on the type of structure and kind of equipment with which the home maker has been provided. To improve the structure to better fit the needs of the home maker and the family it is suggested by the committee that, in the interest of national economy, designers should have at hand the results of thorough-going studies of the extent and nature of household production carried on by families in all parts of the country.

It is evident that the information necessary to assure intelligent design must be broad in scope and specific in character. The Committee on Kitchens and Other Work Centers points out that even the dimensions of the cartons used by manufacturers of foodstuffs should be known to the designer of kitchens, in order that proper storage shelves may be provided for the housewife who prefers to use

food from the original container. Investigation has indicated that storage shelves are too wide and usually are farther apart than is necessary to accommodate packaged food materials.

Out of the preliminary studies there has come a recognition of the need for the development of certain definite measures or modules to be used in house construction so that at least kitchen dimensions may be adjusted to the space needs necessary for such kitchen equipment as sinks, worktables, and cabinets.

In line with these suggestions the kitchen committee has prepared plans and specifications for five types of kitchens that should be of interest to all concerned with the subject. The types include the wall kitchen with all utilities arranged along one side of the room; the square type, approximately 7 by 7 feet, where a maximum of efficiency is inclosed in a minimum of space; the 1-family house kitchen (oblong type), where the routing of steps has been carefully taken into consideration; the combination kitchen and dining alcove designed for convenience and labor saving; and the rural kitchen with additional work space to fit the peculiar needs of the farm home. These plans have been evolved from the studies and experience of some of the leading authorities on the subject and represent the latest developments in scientific kitchen design.

As a result of their investigations, the two committees are of the opinion that architects, contractors, and home makers must get together in order to develop plans which will reduce the cost of housing and increase the joy of living in the house. If such a course is faithfully followed, it is believed that architects and builders will better be able to meet the demands of the home makers of the country for more satisfactory, sanitary, and suitable work areas.

SPECIFICATIONS FOR PHOTOGRAPHIC PAPER APPROVED

Specifications for photographic black-line paper and photographic negative paper, prepared by the photographic supplies committee of the Federal Specifications Board, have been approved for use by the departments and independent establishments of the Government in the purchase of those commodities.

The service requirements for the papers are rather severe because they must be strong to withstand frequent handling and have sufficient purity to last for many years without appreciable deterioration. The specifications are of special interest because the fiber requirements are based on information developed in the Bureau of Standards' studies on the permanence of paper. The results obtained in these studies have indicated that ability of a paper to resist aging is dependent, as far as the character of the fibers is concerned, on their cellulosic purity. Consistent with this new criterion of quality, the specifications contain no reference to the kind of fiber stock, except a re-

quirement in each case that it be free from unbleached or highly lignified fibers, such as ground wood fibers, which are known to be harmful.

The detail requirements include values for wet tensile strength sufficient to withstand handling when wet by immersion in developing solutions, and such values for alpha cellulose content and copper number as to insure sufficient purity of the cellulosic materials composing the papers. The alpha cellulose test is a measure of the unmodified cellulose present and the copper number test is a measure of the degraded cellulose or harmful substances. Permanent paper is characterized by high alpha cellulose content and low copper number.

Cooperative tests for one manufacturer indicated that the black-line and negative papers regularly furnished by him failed to meet the chemical purity requirements of the specifications. A paper stock of foreign manufacture was used in these papers, and it is of interest to note that this manufacturer by substituting a domestic paper stock has improved his products to such an extent that they now conform to the specifications in all respects.

HOME-MODERNIZING ACTIVITIES STIMULATE BUSINESS

Report of Committee Covering 62 Cities Shows \$44,600,000 to be Expended on Property Improvement and Labor

The citizens in 62 cities of the United States have pledged themselves since January 1 to spend approximately \$44,600,000 on property improvement and labor, according to a recent check made by the Home Modernizing Committee of the Department of Commerce. Detailed reports from certain cities indicate that the amount of remodeling and repair work actually accomplished closely approximates the amount pledged. Seventy-two additional cities have been engaged in campaigns, but have not yet submitted reports on the amounts spent for materials and labor, and about 50 other cities are contemplating campaigns.

Ten cities have reported campaigns that have run into millions of dollars subscribed for repair and remodeling work on residential property, and pledges for home improvement work in 26 other cities have equaled \$100,000 to \$1,000,000.

Portland, Oreg., still leads with a total of approximately \$10,548,000, and in addition to this property-improvement figure \$2,826,000 has been expended in public works. Cincinnati, Ohio, has had a campaign in which pledges have been secured for the expenditure of \$4,500,000 in rebuilding, remodeling, and repairing.

Other cities where campaigns have run into millions are: Spokane, Wash., \$4,100,000; Duluth, Minn., \$3,700,000; Richmond, Va., \$2,527,000; Rochester, N. Y., \$3,500,000; Sacramento, Calif., \$2,300,000; Buffalo, N. Y., \$2,000,000; Lincoln, Nebr., \$1,800,000; and Galesburg, Ill., \$1,005,000. Birmingham, Ala., pledged an even \$1,000,000.

Some of the cities where campaigns have run into hundreds of thousands of dollars are: Wheeling, W. Va., \$569,000; Evanston and Freeport, Ill., each \$500,000; Omaha, Nebr., \$500,000; Huntington, Long Island, N. Y., \$350,000; Muncie, Ind., \$333,333; Taunton, Mass., \$327,000; Sharon, Pa., \$320,000; Kingston, N. Y., \$300,000; Superior, Wis., \$300,000; Asheville, N. C., \$266,000; Danville, Ill., \$250,000; Orange, N. J., \$208,300; and Trenton, N. J., \$200,000. In Oshkosh, Wis., plans have been made to spend \$175,000; in Salem, Oreg., \$165,000 has been subscribed; in Montclair, N. J., \$138,000 has been expended; and in each of the cities of Riverside, Calif., Carlisle, Pa., Streator and Urbana, Ill., Keokuk, Iowa, Jackson, Miss., Carthage, Mo., and Columbus and Dayton, Ohio, pledges have run to \$100,000 and over.

The cost of conducting a campaign in any one city of a given population can not be accurately estimated. It varies with location, condition of industry, and the willingness of its people to donate their services. The campaign in Portland, Oreg., a city of approximately 300,000 population, cost about \$4,000. The one in Cincinnati, Ohio, population about 450,000, was put on, according to the report, "without any expense to the committee whatsoever." A city of 25,000 people spent \$175 in creating enthusiasm and secured pledges for property improvement amounting to \$350,000; another city of approxi-

mately the same size spent \$125 and obtained subscriptions amounting to \$500,000; and a third city of 25,000 inhabitants spent \$100 and obtained pledges of property improvement amounting to \$320,400.

Some cities that have carried on employment campaigns have reported the hours of work, or the number of people who have been given employment, rather than the actual amount spent in remodeling or repairing work. Ten cities reporting from the employment angle have recorded 11,000 people who have been aided in finding temporary work, or, in many cases, permanent positions. Thousands of jobs have been created in many other cities, giving employment to thousands of people. Where successful modernizing campaigns have been conducted, calls on the Community Chest and other charitable organizations have been reduced as much as 50 per cent, according to the reports from some of these cities.

The work accomplished in these campaigns has varied from small household tasks to the complete remodeling of a building, and subscriptions have ranged from \$0.50 to \$5,000. Most of the work has involved the small home. Many homes throughout the country have been reconditioned and modernized. The heating, lighting, and plumbing systems have been brought up to date; rooms have been redecorated; new floors have been laid; roofs have been repaired; insulation and safety devices have been installed; and the architectural plans of houses have been changed to afford more comfort and convenience inside and improved appearance outside. Buildings have been entirely repainted or refinished, and landscaping has beautified the grounds. Altogether, it has resulted in raising the standards of home construction and equipment for many families.

Some cities have preferred to emphasize the home improvement work in their campaigns, and have organized committees to canvass householders and secure pledges toward expenditures on reconditioning and modernizing homes; some have preferred to emphasize the employment angle and have canvassed the householders and asked them to cooperate by giving odd jobs and paying small amounts weekly toward the wages of men assigned to the tasks. Other cities have adapted the home-improvement or the man-a-block plan to their own necessities, using one or the other as a suggested basis of operation, and developing their own plans of activity.

One of the encouraging aspects noted in all these campaigns, whatever plan was followed, was that naturally unrelated groups of people showed a remarkable spirit of cooperation in pushing their special campaign through to success. The local and State governments, American Legion, chambers of commerce, men's and women's clubs, churches, schools, boy and girl scouts, commercial organizations, trade associations, manufacturers, architects, engineers, building-trades groups, lumber and building supply dealers, and local financing establishments have all united

to help in an effort to promote employment and bring about a practical revival of business.

The Committee on Home Modernizing, attached to the division of building and housing of the Bureau of Standards, has acted in an educational and advisory capacity, maintaining contact with the numerous cities through correspondence, supplying information,

telling one city what another of comparable population and in similar circumstances has been able to accomplish, furnishing information for newspaper and radio publicity, and promoting interest through articles on improved methods of repairing, remodeling, and modernizing. It will continue to furnish information on modernizing activities to those interested.

CONFERENCE EXAMINES COTTON FOR STAPLE TYPES

United States Department of Agriculture Announces New Standards for "Extra White" Cotton Grades Effective August 10, 1933

Representatives of cotton growers', manufacturers', and shippers' associations and of cotton futures exchanges recently met at the Department of Agriculture in Washington to examine cotton under consideration at that time by the department for the preparation of staple-length types.

The conference also discussed a proposal to represent in physical form the standards for the lengths of staple $\frac{1\frac{1}{2}}$, $\frac{2\frac{1}{2}}$ and $\frac{3\frac{1}{2}}$ inch. This proposal has been approved by the United States Department of Agriculture following the conference.

The staple conference examined a set of boxes prepared by specialists of the department as a tentative revision of the grades for "extra white" cotton. These new boxes, which embrace cotton from all sections of the belt, are for the most part considerably whiter than the present standards for "extra white" cotton, and it is thought may better serve the needs of those who buy or sell cotton of this description. On August 17, following the conclusion of the above-mentioned conference, the department announced the new standards for "extra white" upland cotton, to replace the present standards, would become effective August 10, 1933. The new standards may be used at once, if desired, however, the department stated, in transactions in spot cotton when the parties to the deal specifically indicate that they are using them. A substantial part of the cotton crop in some seasons is "extra white," it was added.

The new standards include the following: No. 3 extra white, or good middling extra white; No. 4 extra white, or strict middling extra white; No. 5 extra white, or middling extra white; No. 6 extra white, or strict low middling extra white; and No. 7 extra white, or low middling extra white.

Official cotton standards of the United States for grade, which embrace the factors of color, leaf or foreign matter, and preparation, have been established for upland cotton and for American Egyptian cotton. The upland group includes all cotton grown commercially in the United States except the Sea Island and American Egyptian varieties. Of upland cotton there are 9 grades for white cotton, 5 grades for extra white cotton, 5 grades for yellow-tinged cotton, 3 grades for yellow-stained, and 3 grades for blue-stained cotton, all of which are represented in "practical forms" or boxes.

Standards have also been established for spotted, light yellow stained, gray, and strict good middling yellow tinged, all of which are bounded and defined by practical forms of adjacent grades. Thirty-two of

the grades, not including those for the extra white cotton, were established in agreement with foreign cotton trade organizations and are known as universal standards for American cotton. In consultation with the industry the principle has been adopted that the leaf or foreign matter and preparation of any grade and color are governed or determined by the standard for the corresponding grade of white cotton and that the standards for extra white as well as for spotted, yellow tinged, light yellow stained, yellow stained, and gray and blue stained cottons determine color only.

The extra white standards apply to any cotton of American growth which corresponds to them in color and in the promulgation of the revised standards selected bales have been taken from each major section of the cotton belt. Inasmuch as a substantial part of the cotton crop in some seasons is of extra white color, it is expected that the new standards will contribute to convenience and accuracy of classification of cotton of this color description.

EAVES TROUGH, CONDUCTOR PIPE, CONDUCTOR ELBOWS, AND FITTINGS

Simplified-practice recommendation No. 29 covering eaves trough, conductor pipe, conductor elbows, and fittings has been reaffirmed, without change, by the standing committee of the industry, according to information received by the Bureau of Standards from the standing committee.

This recommendation, as proposed and developed by the industry, provides for the sizes and weights of these products, and has been in effect since July 1, 1925.

NEW BRITISH STANDARDS FOR COPPER

Two new specifications for copper, just issued by the British Standards Institution, deal, respectively, with plain dead-soft copper strip, bars, and rods, for the windings of electrical machines, and copper commutator bars for electrical purposes, according to information received from the American Consulate General at London.

Both specifications include requirements for conductivity and tensile properties, while in the case of the commutator bars Brinell hardness tests and Shore scleroscope tests are given for application at the option of the purchaser. The selection and preparation of samples for the electrical and mechanical tests are dealt with, and clauses relating to testing procedure are included. The specifications do not standardize sizes for the bars, rod, and strip, but tolerances on width and thickness, and in the case of commutator bars length and angle also, to apply to the nominal sizes ordered by the purchaser, are specified.

HOW STANDARDIZATION EFFECTS SAVING FOR CITY OF MILWAUKEE

City Purchasing Agent Outlines Standardization Plan Under Which City Has Saved Thousands of Dollars

By JOSEPH W. NICHOLSON¹

Prior to the year 1923 no less than 40 different kinds of motor oils were being used by the city of Milwaukee in its equipment, and further it was found that trucks of the same make and capacity, used for the same purpose, were using different makes and grades of oil.

The municipal testing laboratory under the city engineering chemist made a survey of all equipment using motor oil and followed this with chemical and physical tests of the oils being used. While this work was progressing the city council established a bureau of municipal equipment and placed it in charge of a competent superintendent. All equipment used for general purposes was thereafter allocated to this bureau, which in turn rents it to the various city departments. This centralization facilitated the standardization of motor oils. In the course of his tests the city engineering chemist, together with a city mechanical engineer and the writer, devised a machine for the physical testing of oils to augment chemical tests. This machine has been described in various magazines. The results of the survey were:

First, a reduction of grades of oil to the following five: (1) Extra heavy tractor oil, (2) heavy for trucks, (3) medium for passenger cars, (4) zero motor oil, and (5) special oil for model T Ford cars;

Second, the establishing of uniformly high grades of oil; and

Third, an average reduction in price of 12 cents per gallon.

A survey was made of greases used in equipment. Specifications were drawn up and many kinds and qualities of grease were reduced to the following classifications: (1) Pressure gun lubricant, (2) cup grease No. 2, (3) cup grease No. 3, (4) gear compound for transmissions and rear axles. This resulted in cutting prices in half and insured the proper quality of grease, all deliveries being tested to insure compliance with city specifications.

The purchase of cleaning supplies presented a similar problem. Cleaning powders purchased under trade names vary in price from 10 to 17 cents per pound, and as may be surmised the representative of each firm claimed to have the best article for the purpose. The city engineering chemist surveyed the cleaning requirements of the city departments, boards,

and commissions and analyzed all of the various kinds of cleaning and soap powders being used. The cleaning powders almost invariably consisted primarily of trisodium phosphate ground fine. Many firms had added soda ash or inert ingredients. One in particular added a little copper sulphate, commonly known as "blue vitriol," and claimed added value for his product because of the blue color. Incidentally this was the highest-priced material. Available specifications were examined, after which specifications were drawn up covering the following classifications: (1) Cleaning powder, (2) soap powder, and (3) abrasive cleaning powder. The prices of these commodities were thereby reduced to the neighborhood of 4 cents per pound, and the city had since received products of uniform quality.

Paper towels and toilet paper were similarly standardized with the same beneficial results.

Sand, gravel, and crushed stone is commonly used by city departments, boards, and commissions for repair work. It was found that the department superintendents had no common nomenclature to describe the various grades of sand, gravel, and stone, and it was evident that unless some definite standards were set up by the city the proper grades of material could not be obtained. Therefore, the city engineering chemist was called upon to make a survey of this matter. Standards were set up and prepared samples were placed in glass jars. These jars properly labeled were placed on exhibit in the department of purchases, to be viewed by prospective bidders, to supplement the definite specifications on which they were asked to bid, and to assist city departmental employees in ordering the specific grade of repair material desired.

A form letterhead was adopted for interdepartmental correspondence. These forms are used by all city departments for correspondence which does not leave the building. The cost in large quantities is \$2.13 per thousand and saves hundreds of reams of regular letterheads in a year's time.

Bureau of Standards specifications have been very helpful in bringing about a standardization of supplies for this city. The same is true of the American Society for Testing Materials, whose specifications have also been adapted to city use. When preparing new specifications, all known sources are first contacted and the best is gleaned from available specifications.

¹ Purchasing agent, central board of purchases, city of Milwaukee, Wis.

RECOMMENDATION FOR CORRUGATED BOXES MADE AVAILABLE

Simplified-practice recommendation No. R128-31, covering corrugated boxes used by department and specialty stores for packing merchandise, is now available in printed form. Copies of the printed recommendation can be obtained from the Superintendent

of Documents, Government Printing Office, Washington, D. C., at 5 cents per copy.

This simplification program, which was proposed and developed by the industry, reduces the sizes of corrugated boxes formerly used by stores from 322 to a selection list of 75. The users and manufacturers expect to realize substantial savings by adhering to these standards.

AMERICAN STANDARDS ASSOCIATION

Current developments of the following standardization projects under the auspices and procedures of the American Standards Association have been reported by that association.

Testing petroleum products.—The revised scope for the project on methods of testing petroleum products and lubricants has been approved by the association. The revision, which was requested in order to bring the scope of the project into conformity with the scope of the new committee on nomenclature and methods of test of petroleum products of the International Standards Association, broadens the scope of the project to include nomenclature of petroleum, petroleum products, and lubricants, except for the materials excluded in the original scope of the project. The American Society for Testing Materials, sponsor for the project, requested the change.

Standards for motion picture industry.—National standards for all phases of the technical equipment and operation of the motion-picture industry, from the lighting and acoustics of studios to the projectors and screens of picture houses, have been suggested by the Society of Motion Picture Engineers. The development of uniform national standards have been requested in order to avoid the danger of confusion and waste resulting from the establishment of conflicting standards by different groups within the industry. If the request of the society is approved, a technical committee representing all branches of the industry will be organized under the procedure of the American Standards Association. Standardization projects, such as this proposed project on motion-picture standards, grow logically step by step. Topics which initially seem of importance turn out to be not particularly susceptible to constructive and useful standardization; other topics considered initially not to be suitable for standardization afterward develop into topics of major importance. The following list relates only to the general field of motion-picture activities (so far as they are of technological character) and include some of the topics which might be suitable for standardization. The list must be regarded as entirely tentative.

1. *Definitions.*—The terminology of the motion-picture field is confused at present. Such terms as "blimp," "zoom," "pan," "tilt," "projection angle," "wow," or "flutter," and the like, are used without any official recognition. This situation requires correction so far as is feasible.

2. *Film.*—Measurement of characteristics of the base of the film, dimensions of the film and of its perforations, study of film shrinkage and permissible maximum shrinkage, photographic sensitometric tests, measurement and specifications of "safety film," standard width of film of various types, standard containers for film for storage and for transportation, together with methods of preservation of films (for archives, etc.) should be given consideration.

3. *Studio.*—The acoustic treatment and illuminating methods for studios doubtless would permit of a considerable degree of standardization as to nomenclature, measurement, and specifications. Use is made of great varieties of lamps designated, for example, as

"spots," "baby spots," "rifle spots," and so on. Light-diffusing media used are known by a variety of colloquial terms not definitely specified, for example. The acoustic characteristics of studios have not as yet been specified in any precise form in many instances, nor has measuring equipment for the purpose been adequately considered.

4. *Cameras.*—Measurement of the effectiveness of camera-silencing inclosures is required. The amount of significant noise produced in cameras at certain definite distances and in certain definite directions (in free space), the tolerances in the dimensions of the various working pairs, the tensions and pressures in various parts of the mechanism, the dimensions of the magazines and of the magazine hubs, the take-up tension, and numerous other characteristics of cameras require study for possible standardization. The mode of mounting the lenses, the possibility of standardizing focal lengths and apertures of lenses for motion-picture practice, standardization of shutter aperture, definition of tripod arrangements, and nomenclature for devices permitting moving shots (traveling trains, and the like) require consideration.

5. *Recording equipment.*—Microphones, amplifiers, acoustic reflectors, recording equipment, and sound-track measuring equipment fall under this heading. Numerous characteristics of these devices are measurable and might be specified to advantage.

6. *Rerecorders.*—These are used for the introduction of modification of sound effects, and are rapidly becoming an important part of the studio technic. They are used for rerecording from 35-mm film to 35-mm film, and are now being produced as well for rerecording from 35-mm film to 16-mm film. The over-all frequency and volume characteristics of these devices, the amount of acoustic distortion that they produce, and certain other factors are of major importance.

7. *Photographic printing equipment.*—Classification of types of equipment of this sort (continuous and step printers, optical reduction printers, contact printers), permissible speed variation, definition of maximum desirable operating speed, and specification of illumination of the printing surface should be given consideration.

8. *Laboratory processes.*—The development of film is now carried out in various ways by automatic machinery. The terminology requires study, and certain of the processes require precision measurement and definition; for example, methods of measuring developer concentration or speed, measurements of the effectiveness of processes for "hardening," or otherwise preserving film.

9. *Exchange equipment.*—Films, after being returned from the theater, pass to the exchange, where they are inspected. Inspection methods have never been definitely specified or defined. Dimensions and mechanical specifications, as well as strength tests of reels and containers used by exchanges, require consideration, for both nitrate and "safety" stock.

10. *Theater equipment.*—Projectors have numerous dimensions requiring standardization. The tension and pressure at various points of the mechanism,

magazine dimensions, safety devices, contrivances to protect the projectionists' eyes from undue glare, take-up tension, and the like, may all be considered for standardization. Screens (both of the continuous type and of the perforated "sound-transmitting" type) merit study for standardization of their reflection characteristics and specifications thereof. The resurfacing of screens as they become warped brings up a similar series of problems. The amplifying and loud-speaking equipment gives rise to the usual series of electro-acoustic standardization problems ending with the frequency characteristics, distortion character-

istics, and space distribution of the output of the loud-speaker system.

11. *Miscellaneous*.—Such fields as color photography require study. The various processes have never been satisfactorily defined, nor have the various forms of cameras, lenses, processing equipment, and projectors been put on a suitably precise basis. Three-dimensional pictures require definition. Frequency systems which give perspective impressions are classified as 3-dimensional or "pseudo-stereoscopic." A considerable amount of confusion exists here on terminology.

HIGHWAY-BUILDING CONGRESS TO MEET

Convention to be Held in Detroit During the Week of January 16 to 23—Standards for the Construction Industry will be Considered

The Highway and Building Congress, the largest and most significant gathering in the history of such enterprises, will be held in Detroit during the week of January 16 to 23, 1933. This was the decision of officials of 10 national organizations, representing every phase of the mammoth highway and construction industry, who recently met in Detroit to formulate plans.

The program mapped by executives calls for concurrent meetings of the several individual organizations during the first three days of the congress, to be followed by a joint session which will map a coordinated procedure for the entire industry and allied enterprises.

Standards for the construction industry will be considered in the broad phases of uniformity of methods that will permit of standardization. Specifically, committees of the American Road Builders' Association will present reports on the following studies:

The use of single-track concrete roads, in cooperation with the Portland Cement Association; brick pavements, in cooperation with the National Paving Brick Manufacturers' Association; asphalt pavements, in cooperation with the Asphalt Institute; reinforced concrete pavements and bases, in cooperation with the Wire Reinforcement Institute; compaction of earth fills as effected by type and size of haulage equipment and other equipment, in cooperation with the Highway Research Board; equipment for construction and maintenance of low-cost roads, in cooperation with the American Association of State Highway Officials; equipment for spreading and finishing pavement surfaces, in cooperation with the American Association of State Highway Officials; standardization of attachments for snow plows, in cooperation with the American Association of State Highway Officials; standardization of blades for truck and other scrapers, in cooperation with the American Association of State Highway Officials; design, construction, and use of corrugated metal pipe culverts, in cooperation with corrugated-pipe manufacturers; design, construction, and use of cast-iron pipe culverts, in cooperation with a manufacturer; design, construction, and use of vitrified-pipe culverts, in cooperation with the Clay Products Association; design, construction, and use of concrete-pipe cul-

verts, in cooperation with the Concrete Pipe Association; developments in the design and construction of low-cost roads (graded aggregate type), in cooperation with a group of manufacturers; a uniform specification for traffic paint, in cooperation with the Institute of Paint and Varnish Research and manufacturers of paint; equipment for construction and maintenance of steel highway bridges, in cooperation with the American Institute of Steel Construction; and use of emulsions on low-cost roads, in cooperation with the emulsion group of manufacturers.

CANADIAN RESEARCH LABORATORIES DEDICATED

In the presence of distinguished visitors from Great Britain and the British Dominions who were attending the Imperial Economic Conference the new National Research Laboratories building at Ottawa, Canada, was formally opened by the Governor General of Canada on the evening of August 10. R. B. Bennett, Prime Minister of Canada; H. H. Stevens, chairman of the committee of the privy council on scientific and industrial research; and Dr. H. M. Cory, president of the National Research Council, participated in the ceremonies.

Constructed at a cost in excess of \$3,000,000, the new laboratories represent the nation's most ambitious scientific undertaking. The building, containing approximately 250,000 square feet of floor area, is 418 feet long, 176 feet wide, and 60 feet high. It is of steel-frame construction faced with Wallace sandstone brought from quarries in Nova Scotia. As the structure has been erected for purposes of research, it is, generally speaking, a system of laboratory units, with accommodation on the main floor for the council staff. Almost the entire rear portion of both the basement and first floor will be occupied by the engineering physics laboratory. Here the testing machines and cranes that require a high ceiling will be located. The crane in the hydraulic and thermodynamic laboratories will be of 15 tons' capacity. In the electrical laboratories will be apparatus capable of testing up to 600,000 volts or more.

Throughout the other portions of the building are what are called unit laboratories, 12 by 12 feet, separated by temporary partitions that may be removed without breaking into the walls of the building to accommodate the various types of work that the future will bring. In the northwest end of the building are the electrical laboratories and other branches of the division of physics and engineering.

FLAX AND HEMP TWINE SIMPLIFIED IN VARIETY

Inasmuch as flax was the first vegetable fiber to be spun into yarn, twisted into twine, or woven into cloth, particular importance attaches to the recently approved simplified practice recommendation for twine made of this fiber; twines made of hemp are included in the recommendation.

Flax and hemp twines are different from cotton because they are both stalk fibers, while cotton is a boll fiber, and relatively short in comparison. Because of this great length, the twines produced from flax and hemp fibers have great strength, and are suitable for a variety of purposes where such strength is needed. Some of the industries using these twines because of this characteristic are the meat packing, furniture manufacturing, broom manufacturing, mattress manufacturing, and many others.

The need for simplification in this industry was suggested by the General Electric Co. in June, 1931. This company in attempting to draft purchase specifications found lack of uniformity in the characteristics of these twines which were offered on the market. At the request of this company, the division of simplified practice of the Bureau of Standards, called a meeting of manufacturers to consider the problem. This meeting, held in New York on August 28, 1931, and attended by important producers and by representatives of the National Paper Trade Association, decided that there existed a condition of diversification which could be corrected by the development and general adoption of a simplification program, patterned after the simplified-practice recommendation for soft fiber (jute) twine, which had recently been adopted by that industry. As a result of the action taken at that time, manufacturers in cooperation with the division of simplified practice conducted a survey of existing varieties, and drafted a tentative simplified-practice program, which was used as the basis for the general conference at which the recently approved recommendation was adopted. The recommendation is concerned with two general classes of twine—fine unfinished flax and fine finished and fine unfinished hemp twine.

Eight fine finished hemp twine numbers, ranging from 18 to 84, inclusive, are retained in the schedule for regular stock purposes. These numbers apply to twines known in the trade as AA and AB Italian, and B and BC American, the latter also known as BC twine. For each of the 8 numbers there is given for each kind of twine the minimum length per pound and minimum breaking strength. The schedule of put-ups for fine finished hemp twine includes weights of balls, cut lengths, tubes, coils, and reels.

Fine unfinished flax and hemp twines are specified by ply, and these run from three to six, inclusive. The flax twine is specified in two grades, which differ in breaking strength only, and have the same minimum length per pound. Fine unfinished hemp twine is to be made in two general classes—Italian and American. Each of these is made in two grades—first and second. The fine unfinished hemp is specified by ply, and like the unfinished flax, these run from three to six, inclusive. First and second grade Italian and second-grade American have the same minimum length per pound for each ply, but vary in breaking strength, the first

grade running about 10 per cent stronger. The first-grade American has greater length per pound in each ply than the second-grade American, but the breaking strengths are about the same. Fine unfinished flax and hemp twine have the same schedule of put-ups. These are in balls, skeins, tubes, coils, and reels.

The schedule became effective June 17, 1932, and its operation and revision will be guided by a standing committee of manufacturers, distributors, and users. The Bureau of Standards will cooperate with the standing committee in review and revision when these are found necessary by the industry. A printed booklet will be made available to the industry by the Bureau of Standards, as one of its series of pamphlets on waste elimination through simplification.

TESTS OF ELEVATOR BUFFERS

Arrangements have been made with the Bureau of Standards whereby tests can be carried out on elevator buffers in order to determine whether the buffers meet the requirements of the American Standard Safety Code for Elevators, Dumbwaiters, and Escalators formulated under the joint sponsorship of the American Institute of Architects, the American Society of Mechanical Engineers, and the Bureau of Standards, and approved by the American Standards Association. This code has been adopted as mandatory regulations by certain administrative authorities, and the same requirements are incorporated in some local codes, such as the one in effect in New York, N. Y.

The following tests will be carried out by the Bureau of Standards in the order stated: (1) Lateral movement of plunger, (2) churning, (3) retardation, (4) oil leakage, and (5) plunger return. If a buffer fails to meet the requirements of the code on any one of these tests, the remaining tests will not be made unless the submitter so requests. Measurements of retardation under test 3 will be made for free drops of the elevator car from the two heights specified in the code with such of the following loads as the test officer considers necessary: (a) Manufacturer's rated minimum load, (b) manufacturer's rated maximum load, and (c) manufacturer's rated maximum load plus 10 per cent. These drops will be made for each porting (or calibration) of the buffer.

A mailing list of administrative officials and main officers of insurance companies who agree to recognize the results of these tests will be maintained by the committee on research at its headquarters, in the office of the American Society of Mechanical Engineers.

If a submitter so desires and submits the necessary blue prints, the successful passing of tests will be bulletined to such mailing list with copy of blue print identifying the buffer tested. A similar course will be followed when modifications of construction are made which do not affect the performance of the buffer.

Applications for test should be addressed to the committee on elevator research, the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York, N. Y., and should be accompanied by a definite statement as to tests results to be reported.

SURGICAL DRESSINGS

Recommendation Promulgated Under Auspices of Bureau of Standards Developed by American College of Surgeons

The simplified-practice recommendation for surgical dressings is based on a study made by the hospital research and information department of the American College of Surgeons in cooperation with hospital executives, surgeons, manufacturers, and scientific laboratories. The study was made under the direction of Malcolm T. MacEachern, M. D., C. M., director of hospital activities of the American College of Surgeons, whose report, *Manual of Surgical Dressings*, explains the reasons for undertaking the work and the results which are expected to follow the adoption of the recommended sizes of dressings.

For the purpose of making the recommended sizes of dressings available to all concerned and to secure their wide adoption and use, the simplification and standardization committee of the American Hospital Association requested the division of simplified practice of the Bureau of Standards, to call a general conference of all interests to obtain industry's approval and consent to incorporate the recommended sizes of dressings in a simplified-practice recommendation. This conference was held in Toronto, Canada, September 28, 1931, in conjunction with the annual meeting of the American Hospital Association, and resulted in the adoption of a simplified schedule of dressings which appears in the recommendation. The industry has since approved the program. The program covers nomenclature, sizes, and methods of preparation of the following surgical dressings made of gauze:

1. *Sponges*.—Dressings for sponging and wiping.
2. *Abdominal packs*.—Dressings for walling off.
3. *Sterile gauze dressings*.—Dressings to cover incision after operation.
4. *Pads*.—Dressings to absorb drainage after operation.

The methods of preparation of these dressings are illustrated by sketches showing the sequence of folds, sewings, etc. Tabulated information for each class and kind of dressing gives details as to amount of gauze to be used and construction of gauze used.

The standardization of surgical dressings is not an attempt to eliminate, without exception, all but a few styles and sizes. It contemplates only the adoption of a few generally approved dressings which will meet the vast majority of surgical requirements and leaves a free hand in the matter of special dressings for particular needs. The present diversity of surgical-dressings practice does not seem to indicate that literally thousands of dressings are necessary, but rather that present practice is only the natural result of hundreds of hospitals attacking the same problems independently and developing their own technique for each case without knowledge of what other institutions are doing.

Standardization of surgical dressings would be undesirable if it should increase the cost of dressings. The proposed dressings have been selected only after very careful study of this factor, and it is believed that they will prove decidedly economical in the average hospital. In the first place, each dressing has been designed to give the required size and bulk with a minimum amount of material. Each will do the task for which it is intended, yet none is larger

than is necessary for good results; hence there is a minimum waste of material. Furthermore, the sizes are such that they can be cut without waste from the standard-sized packages of gauze, absorbent cotton, and cellulose which are regularly offered by manufacturers. In the same connection it must also be borne in mind that additional economies are possible through the elimination of the need for carrying in stock many special sizes, as outlined in the preceding paragraph. One of the most desirable effects of any standardization movement is economy, and it is believed that the proposed dressings will prove to be fully acceptable in this respect.

Another advantage of standardization which may not be quite obvious to many persons, but which is nevertheless a very real one, is that it will permit manufacturers of surgical dressings to produce ready-made dressings much more cheaply. As long as such a wide variety of sizes is in use there is little incentive to the manufacturer to produce dressings which he knows are used by only a limited number of hospitals. If he does try making dressings by machine, he sells so few of each size that they can not be produced at low cost. There is on foot a very pronounced trend toward ready-made dressings in the hospital field, a trend which is likely to become more and more pronounced and which eventually will benefit every institution. Standardization is desirable because it helps this trend and hastens the day when it will be of practical interest to every hospital, large and small.

The recommendations as to sizes, structure, and form of dressings are offered in the belief that they are ample as to the requirements, practical, economical, and feasible. Improvements are bound to follow, and therefore no absolute finality is to be given the selections listed. Standardization does not preclude progressive changes for betterment, but furnishes a sound basis on which to stand tentatively while building toward the future. While no definite figures are available as to the number of sizes of dressings which could be replaced by the general adoption of this simplified-practice recommendation, a good idea of the elimination of variety made possible by this program may be obtained from the following, from the *Manual of Surgical Dressings*:

This survey revealed a wide divergence in surgical dressings practice among hospitals of the United States and Canada. Approximately 5,000 different types of dressings were found, and as many as 1,500 varieties of one type used for practically the same purpose.

The recommendation will be subject to revision from time to time by a standing committee of representatives of manufacturers, distributors, and users. The Bureau of Standards, through its division of simplified practice, will cooperate with this committee.

DENTAL-RUBBERS PROGRAM ACCEPTED

The required degree of acceptance has been accorded simplified-practice recommendation No. R138-32, on dental rubbers, and it may be considered as in effect as of September 1, 1932.

This simplification program, which was proposed and developed by the industry, establishes names for colors and uniform packaging of veneering and base rubbers.

METRIC WEIGHTS AND MEASURES EXHIBITION TO BE HELD IN AUSTRIA

An exhibition in commemoration of the sixtieth anniversary of the introduction of the metric system will be held in Vienna from September 15 to October 31, 1932, under the auspices of the Trades Union of the Province of Lower Austria in cooperation with the Austrian Federal Department of Weights and Measures, according to a dispatch from American Minister G. B. Stockton at Vienna.

The exposition will be under the patronage of the Austrian President, Herr Wilhelm Miklas. According to an announcement of the Austrian Foreign Office, it "will illustrate the present status of production and use of measurement apparatus and procedure and will represent in a historical section the development of the metric system and the measurements based thereon." The displays are to be grouped in six main sections.

Section 1 will deal with the history of the development of the metric system, and the exhibits will include premetric and historical metric measures and measuring instruments. Section 3, "Metric measures and measuring instruments," will be one of the largest in the exhibition. Here will be displayed all kinds of measuring instruments and devices. The fourth section will deal with standardization and will include a history of standardization in Austria; organization of the Austrian standardization service; appliances used in the scientific work of standardization; and exhibits of appliances used by calibrating offices. Other sections will be devoted to a representation of the modern metric system and its units; organization of a standards police force; and a compilation of standards as far as they are connected with measurements. The use of measuring instruments for educational purposes will be shown in a separate section.

ADHERENCE REPORT ON INDUSTRIAL TRUCK TIRES

As is well known, the procedure of the division of simplified practice of the Bureau of Standards provides that each simplified-practice recommendation be periodically reviewed by its standing committee to keep it current with changing trends in industry. In 1931 the division conducted at the request of the standing committee a survey on industrial truck tires to secure data on the production of individual sizes of tires, and obtained comments and suggestions on which the committee could base its action in revising or reaffirming the current recommendation covering these commodities.

After reviewing the report for the year 1930 the committee decided to postpone action on the various suggested revisions until information could be obtained covering commercial activities during the year 1931. This second survey was conducted, and the report for the year 1931 is now before the standing committee for consideration.

The simplified-practice recommendation on industrial truck tires recommends width of tire and nominal wheel diameter for 30 flat-base tires and 6 channel-base tires. Five manufacturers of industrial truck tires reported a total production of 79,259 tires in

1930, of which 63,485, or 80 per cent, were of the simplified sizes. In 1931 the same five concerns produced 48,459 tires, of which 37,435, or 77.3 per cent, were of the recommended sizes. Reports from 14 producers of industrial trucks showed a total of 19,667 tires used as original equipment during 1930, of which 15,038, or 76.5 per cent, were of the simplified sizes. In 1931 nine truck manufacturers used 12,957 flat-base tires, of which 9,462, or 73 per cent, were of the recommended sizes. In 1931 only one truck concern reported use of channel-base tires, and the figures, therefore, could not be included in the report.

When the recommendation was drafted the manufacturers felt that all the channel-base tires and nine sizes of flat-base tires could be eliminated at some future time, and the general conference incorporated in the recommendation the suggestion that this possibility be given careful consideration. That the makers of trucks are endeavoring to follow this suggestion is seen in the fact that the nine sizes of flat-base tires recommended for elimination represented only 9.4 per cent of all flat-base tires used by this group in 1931, whereas in 1930 these sizes made up 13.5 per cent of the total number of flat-base tires used as original equipment.

While adherence to the recommended sizes was found to be somewhat less in 1931 than in 1930, it is still close to 80 per cent. It is safe to assume that the majority of the nonstandard sizes now being made and used are for replacement purposes, with some oversize tires needed to equip new trucks with higher tonnage capacities. It is reasonable to expect that with the gradual obsolescence of trucks requiring nonstandard sizes of tires the elimination from the present schedule of certain sizes which are little used, together with the addition of certain oversize tires which have been suggested, adherence to the recommendation will be considerably strengthened in the next year or two.

ALUMINUM ANALYSIS

The Aluminum Research Institute, 308 West Washington Street, Chicago, Ill., has issued a booklet covering standard methods for sampling and analyzing aluminum and certain aluminum alloys. It represents two years of research and study by a special committee composed of chemists in responsible charge of the laboratories of member companies, in collaboration with Lucius Pitkin (Inc.), consulting analysts.

The object of the committee was to survey, test, and check methods of sampling and analyzing aluminum and its alloys, now in vogue, and to recommend new methods based on the data accumulated. The work was carried on cooperatively in member laboratories, with frequent meetings for comparison of results, criticism, discussion, and revision of methods. Final approval, upon which the current report is based, was reached March 12, 1932.

The research includes the various grades of pure aluminum, also aluminum-silicon, aluminum-copper, and aluminum-silicon-copper alloys in a wide range of constituents.

It is the intention of the institute to issue, from time to time, data on methods of sampling and analysis based on requirements of accuracy, simplified technique, minimum testing time, and moderate cost.

SAFETY CODES FOR THE PREVENTION OF DUST EXPLOSIONS

"Safety Codes for the Prevention of Dust Explosions" is the title of a publication issued by the Bureau of Labor Statistics, United States Department of Labor. Under the designation of Bulletin No. 562, Bureau of Labor Statistics, copies may be had from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 15 cents per copy.

Dust explosions have been responsible for a series of disasters involving large losses of life and property extending over a long period of years. It is only recently, however, that the seriousness of this hazard has been generally recognized and measures for its control undertaken. It has been found that practically all types of combustible dusts when mixed with air in proper proportions can be readily ignited by external sources of heat or flame.

The codes covered by Safety Codes for the Prevention of Dust Explosions, all of which have been promulgated by the American Standards Association as American standard, are: Safety Code for Starch Factories, Safety Code for Flour and Feed Mills, Safety Code for Terminal Grain Elevators, Safety Code for Pulverizing Systems for Sugar and Cocoa, Safety Code for Spice-Grinding Plants, Safety Code for Wood-Flour Manufacturing Establishments, Safety Code for the Installation of Pulverized-Fuel Systems, Safety Code for Coal Pneumatic-Cleaning Plants, and Safety Code for the Use of Inert Gas for Fire and Explosion Prevention.

IMPERIAL ECONOMIC CONFERENCE FOSTERS STANDARDIZATION AS A MEANS OF ECONOMIC COOPERATION

Standardization, industrial and agricultural, was considered by the recently held Imperial Economic Conference at Ottawa, Canada, as a method of economic cooperation. The conference approved the following standardization program presented by the several respective committees.

Industrial standardization:

1. To assist coordination of the work of national standardization the following principles should as far as possible be observed: (a) Specifications should be in accordance with the needs of industry, (b) community of interest of producer and consumer should be maintained, (c) specifications should be arrived at by general consent, (d) periodical review and revision, and (e) circulation of information regarding initiation and development of new specifications.

2. Having regard to the disadvantages which occur when a statutory provision embodies a standard specification verbatim, each Government of the Commonwealth, in cooperation with its national standardizing body, should bring under review the position with regard to such statutory provisions.

3. The Governments should give favorable consideration to providing free entry to specifications and other documents circulated between the national standardizing bodies.

4. Each national standardizing body should consider the issue of a standard schedule of colors.

5. To promote intraempire trade in steel, timber, industrial chemical products, and replaceable parts of agricultural implements and machinery, the parts of the Commonwealth affected should endeavor to take immediate steps to secure adoption of commercial standard specifications.

6. Cooperation with regard to standard specifications for aircraft materials and component parts and particularly the method of testing is urged.

7. There should be machinery for liaison between Commonwealth standardizing bodies in order to facilitate cooperation and consultation.

Grading and standards of agricultural products:

1. In accord with the resolution which was passed by the research committee of the Imperial Conference, 1930, Commonwealth countries should work toward the adoption of uniform standards for those agricultural products which most readily lend themselves to standardization.

2. It has been suggested that, in view of the great importance from the producers' standpoint of maintaining public confidence in a product, it would be helpful if the United Kingdom Government would legislate to require all wholesale trade in suitable commodities (such as eggs) to be conducted on the basis of Commonwealth standards. As important questions of policy and administration are involved, this proposal should be further explored.

3. In order to facilitate the unification of Commonwealth grade standards, arrangements should be made for the exchange of memoranda describing in detail the grade standards of the British Commonwealth.

4. *Standard containers.*—The standardization of containers is desirable and should be made the subject of further study in conjunction with the program of unification of grade standards.

BRITISH STANDARD FOR RAILWAY ROLLING-STOCK SPRINGS

The revision of the series of British standard specifications for railway rolling-stock materials which has been in hand for some years, has now been completed by the British Standards Institution with the publication of the revised edition of part 3 of Report No. 24.

This deals with laminated, volute, and helical springs, and with the steels for these springs. The changes in the chemical composition of the steel are among the principal modifications that have been made in the revised issue. In the case of laminated springs, the wide range of carbon limits, originally given, has now been divided into two separate ranges. The one is suitable for springs which are to be subsequently water hardened and the other for springs which are to be oil hardened. In the case of volute and helical springs, the chemical composition of the material has now been amplified by the addition of limits for silicon and manganese.

A clause covering the rolling margins of the spring bars has also been included. A further specification has been added, covering spring-steel bars to be used for the manufacture of volute and helical springs, and for the standardization of the dimensions of the rib in the leaves of laminated springs.

STANDARD TEST ON GALVANIZED WIRE

The method of testing galvanized wire by dipping samples in a solution of copper sulphate is so well known that, at first sight, it would appear hardly necessary to issue a specification on the subject. It is found in practice, however, that although the general principles of the test are almost universally accepted, individual manufacturers and inspectors often introduce slight variations in the testing routine which, though apparently unimportant, have a substantial effect on the results of the test.

The British Standards Institution has accordingly coordinated all the descriptions of the test, given in various specifications, and has published a new specification entitled "The Testing of the Zinc Coating on Galvanized Wires." The new publication states concisely but in adequate detail the exact procedure to be followed in the preparation of the samples, the preparation of the copper-sulphate solution, and of the number and duration of dips in the solution for wires of various gages. A feature of particular interest is the introduction of a combined mechanical and chemical test, in which the sample of wire is first wrapped round a mandrel of a specified size, is then unwound, and subjected to the dipping test.

Research work with a view to finding a test which has a definite relation to practical service conditions, or provides an absolute comparison between various processes of galvanizing, is at present in hand. It is recognized, however, that it will still be a long time before the copper-sulphate test will be superseded, and the new specification should, therefore, prove of considerable service to both manufacturers and users of galvanized wire.

In addition to the work being done in England, as just stated, there is now in progress at the Bureau of Standards in this country a study of certain factors which affect the copper-sulphate dip, or Preece, test with the object of determining the cause for the erratic results that have been reported for this test especially when used for different types of zinc coatings.

PROMOTION OF SIMPLIFIED RECOMMENDATIONS

Simplified-Practice Recommendations Covering Open Web Steel Joists Identified in Trade Literature by Manufacturers

Every manufacturer who has accepted simplified-practice recommendation No. R94-30, covering web steel joists, has expressed his intention to identify the simplified lines in handbooks, new catalogues and trade lists, according to information received by the division of simplified practice of the Bureau of Standards.

The general acceptance of the identification plan will assist this industry in maintaining close adherence to the waste-elimination program. Cooperation by architects, engineers, contractors, purchasing agents, fabricators, and others will greatly increase the benefits and economies possible through simplified practice.

Simplified-practice recommendation No. R94-30, which was proposed and developed by the industry, pertains to joists that measure between 8 and 16 inches

in depth and which are not longer than 24 times their depth. The recommendation also specifies properties and allowable loads in pounds per linear foot. In formulating this simplified list of joist sizes, it was necessary to include designations, stresses, resisting moments in inch-pounds, and maximum reaction in pounds. This program has been in effect since October 1, 1930.

This is the fourth simplified-practice recommendation in connection with which all manufacturer acceptors have decided to identify their commodity as being in accordance with the industry's recommendation. In accepting others of the more than 130 active programs, an increasing number of manufacturers are identifying their commodities as conforming to specific simplified-practice recommendations.

The National Association of Purchasing Agents, the American Institute of Architects, the Associated General Contractors of America, the National Electric Light Association, the American Gas Association, the American Electric Railway Association, and other representative users of simplified commodities have for some time strongly urged that this policy be adopted by manufacturers. When the simplified items are so identified in trade literature, their selection can be made without difficulty, and often much waste now incurred in checking files and auxiliary records for this data is eliminated.

DENTAL MOUTH-MIRROR PROGRAM APPROVED

Simplified-practice recommendation No. R137-32, covering dental mouth mirrors, has been accorded the required degree of acceptance by the industry.

This recommendation, which was proposed and formulated by the industry, provides for the diameters of plane and magnifying mouth mirrors having cone socket stems. It may be considered as in effect as of September 1, 1932.

COMMERCIAL STANDARD FOR APPLE WRAPS SUBMITTED FOR INDUSTRY'S APPROVAL

A commercial standard for paper apple wraps was circulated August 12 by the division of trade standards for the general approval of those interested in the production and use of this commodity. This standard was recommended at a conference of the industry held in Seattle, Wash., on May 19, and embraces the requirements of satisfactory dry and oiled paper apple wraps.

While the thin paper which is used to cover many of the apples that are held in cold storage appears to be merely a protection against dust, it is in reality of vastly greater importance, since the wraps, particularly of the oiled types, practically eliminate a physiological disease which occurs in storage and is known as apple scald.

The commercial standard specification covers sizes, weights, strength requirements, and oil content, together with reasonable manufacturing tolerances and methods of testing.

Copies of the recommended standard are available, without charge, from the division of trade standards, Bureau of Standards, Washington, D. C.

BRITISH STANDARD FOR BRAIDED CABLES

The use of braided conductors for overhead transmission lines is the exception rather than the rule in England, and the issue of a British standard specification for such material may, therefore, appear at first sight to be uncalled for. Such a specification has, however, been published by the British Standards Institution, and its object is primarily to assist British manufacturers in their export trade, more particularly with New Zealand.

In this Dominion the use of braided cable (weatherproof wires) is compulsory in certain circumstances. Users in New Zealand have, in the past, been unable to rely on the product being uniformly good, owing to the lack of a British standard specification, and with a view to securing an improvement in the position, the New Zealand Electric Supply Authority Engineers' Association requested the institution to prepare a specification, the adoption of which probably will ultimately be made compulsory in New Zealand.

Braided cable is also used in other parts of the Empire, and the new specification should, therefore, meet a considerable demand. The points covered by the specification include the mechanical and electrical properties of the copper conductors, and the quality and dimensions of the braiding.

The properties of weatherproof wires (now preferably called weather-resistant) have also been under discussion in the United States for several years. A specification for such wires has recently been submitted to letter ballot of the American Standards Association sectional committee on insulated wires and cables. On the other hand, an article by C. F. Harding, L. L. Carter, and J. W. Olson, of Purdue University, appearing in *Electrical Engineering* for May, 1932, pointed out troubles which had arisen from cheapening of the weather-resistant covering in recent years and proposed a new specification for the covering.

BRITISH STANDARD FOR RADIO TUBES

Prior to the meeting of the International Electrotechnical Commission, held in September, 1927, there existed in Europe two slightly divergent sets of dimensions for wireless valve bases (radio tubes), those adopted in Great Britain on the one hand, and those taken up by the majority of continental countries on the other.

These two sets of dimensions were just sufficiently divergent to prevent complete interchangeability. At the meeting of the commission above referred to, a compromise was suggested whereby complete interchangeability could be secured by making a slight alteration to both sets of dimensions hitherto in force. This compromise has been adopted by the British Standards Institution, with the agreement of the Radio Manufacturers' Association, and the Valve Manufacturers' Association, and a specification entitled "The Dimensions of Radio Valve and Valve Sockets" has been published by the institution. It is hoped that this publication will assist in promoting the evolution of a more satisfactory design of resilient socket, and will encourage the general adoption of resilient sockets for both four and five pin valves.

The American design of base for radio tubes is distinctly different from the European type covered by the British specification. It is likewise recognized by the International Electrotechnical Commission. Detailed specifications for this base were approved in 1929 by the American Standards Association as an American tentative standard under the title "Specifications for Vacuum-Tube Bases." In 1932 these specifications have been advanced to the status of American standard as a part of a more complete formulation of standard vacuum-tube base and socket dimensions.

The 1929 specifications for vacuum-tube bases covered only dimensions of standard 4-pin vacuum-tube bases of the large and small type, while the new standard covers in addition the following: Dimensions of large 4-pin base without bayonet pin; large 5-pin base without bayonet pin; large 5-pin base; terminal caps for receiving tubes and transmitting tubes; 4-pin transmitting-tube base; large transmitting-tube base; terminal cap with large transmitting tubes; 4-pin socket for receiving tubes; 5-pin socket for receiving tubes; and standard connections for vacuum-tube bases.

RECOMMENDATION COVERING CUPOLA REFRACTORIES BEFORE INDUSTRY FOR ACCEPTANCE

The simplified-practice recommendation covering cupola refractories has been mailed by the Bureau of Standards to all interests in the industry for their consideration and written approval. The recommendation will be effective on announcement by the Bureau of Standards that the required degree of acceptance has been received.

The recommendation, which was proposed and developed by the industry, is concerned with the sizes and varieties of cupola lining, one and two hole tap-out blocks, and slag-hole blocks.

SIMPLIFICATION FOR PAINT AND VARNISH

The paint and varnish industry has drafted a simplified-practice recommendation to be substituted for the limitation of variety recommendation covering paint and varnish, and in response to the industry's request, the division of simplified practice of the Bureau of Standards has mailed it to all interests in the industry for their consideration and written approval. The story covering this measure appeared in the April, 1932, *COMMERCIAL STANDARDS MONTHLY*, under the heading of "Paint Industry Promulgates Standardization Program."

The original limitation of variety recommendation, proposed and developed by the industry, has been in effect since September 1, 1924.

The new simplification program provides for shades and tints of paints, varnishes, enamels, and stains, and for the capacities of primary containers. The simplification of secondary containers, or shipping cases, of paint and varnishes which was suggested by a member of the industry will be considered by the industry in the near future to determine what elimination of waste can be effected in this field.

BUILDERS' TEMPLATE HARDWARE

Pursuant to recommendations of the Manufacturers' Advisory Committee on the Standardization of Builders' Hardware and with the approval of the standing committee, a revision of Commercial Standard CS9-29, Builders' Template Hardware, has been accepted by the industry.

The revision includes requirements on template letter-box plates, together with modifications and corrections in certain details pertaining to template locks and hinges resulting from experience since it became effective in September, 1929.

Mimeographed copies of this revision are available from the division of trade standards, Bureau of Standards, Washington, D. C.

HOSE CONNECTIONS FOR WELDING AND CUTTING TORCHES

The recommended commercial standard for hose connections for welding and cutting torches was circulated to the industry for acceptance on June 25, 1932.

This standard was requested by the National Screw Thread Commission, and incorporates the specification adopted by this committee and published in its 1928 annual report. The specification covers requirements for the sizes of hose connections, the purpose being to provide parts designed to be readily interchangeable for replacement. Provision is also made for identification and certification to buyers.

INTERNATIONAL STEEL GROUP FORMED

An International Institute of Steel Construction has been organized, to which American participation has been invited, according to information received from the American Institute of Steel Construction (200 Madison Avenue, New York). It is proposed that executive offices shall be established in The Hague. This step was taken at a conference held last May in Paris, a report on which has just been received.

During the last 11 years offices have been established in most steel-producing and steel-consuming countries, with the purpose to encourage the use of steel upon a more rational and economical basis. This has been done by pointing out the excellent features of this material as well as the advantages its use offers. In America the foundation of the American Institute of Steel Construction in 1921 gave an impetus to this movement.

Among the countries cooperating in the international institute are France, Belgium, Germany, England, Poland, Italy, and Holland.

POWER-DRIVEN DERRICK CRANES

Revision of Specification

The British Standards Institution has issued a revision of its specification relating to power-driven derrick cranes. In view of the recent requirement of the British building (amendment) regulations that all cranes used for the purpose of constructing a building or any addition to the structure of a building shall comply with the specification, the present publication is of great importance to builders and contractors.

In the revised specification the general factor of safety has been lowered to a minimum of $4\frac{1}{2}$, but no change has been made to the minimum factors of safety of gearing or wire ropes, or to the maximum allowable working stresses for certain other component parts. As hitherto, all derricks have to be subjected to load and overload tests, and a test certificate has to be furnished with the machine. The specification now permits, where between the buyer and the maker, the use of fusion-welded joints. A detailed list of the statutory regulations affecting cranes in Great Britain has been included as an appendix. Other appendixes deal with the information which should be furnished by the user with the inquiry or order, and by the maker.

BRITISH STANDARD FOR SCREWS

The British Standards Institution has added two specifications to its list dealing with bolts, set screws, and nuts. These additions cover bright countersunk, round, and cheesehead screws (British Standard Whitworth), and British standard fine; and bright square-head set screws with flat chamfered ends (B. S. W., and British standard fine).

These specifications provide for round, countersunk, and cheesehead screws from $\frac{1}{8}$ up to 1 inch in diameter, and square-head set screws from $\frac{1}{4}$ up to 1 inch in diameter. The general dimensions of the screws are given in the specifications.

RECOMMENDATION FOR FOLDING BOXES NOW AVAILABLE

Simplified-practice recommendation No. RI27-31, covering folding boxes for use by department and specialty stores is now in print and can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents each.

The simplification program, which was proposed and developed by the stores with the assistance of the manufacturers, provides 59 selected sizes of this type of box. These are to take the place of 262 sizes formerly in use as reported in a survey by the United States Department of Commerce.

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